A TUTORIAL FOR USE OF THE TENEX ELECTRONIC NOTEBOOK-CONFERENCE (TEN-C) SYSTEM ON THE ARPANET

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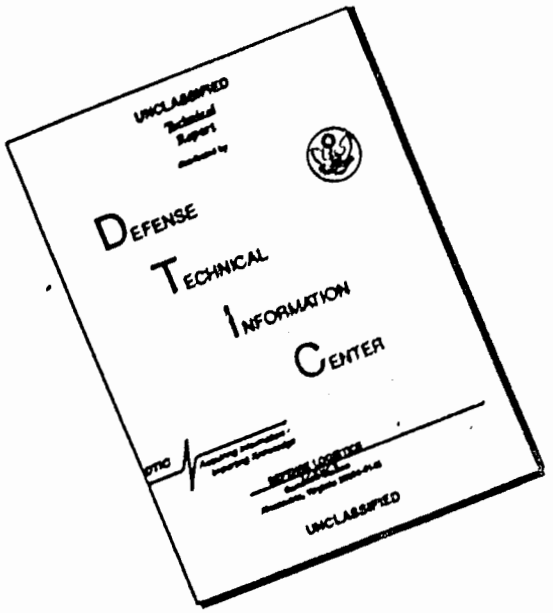

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20. ABSTRACT

This report describes a tutorial for introducing novice users to a collection of computer programs which support interpersonal communication. The tutorial is designed to reduce the apparent complexity of the multiple command languages involved. The instructional strategy used provides a model for other training situations in which a collection of computer programs must be taught simultaneously.

The tutorial first presents concepts which facilitate understanding of the various command languages. This is followed by a series of exercises leading up to the new user's performance of a sample task involving a limited subset of all commands. The tutor monitors the new user's progress and offers advice. This approach puts the new user in an active, problem-solving role from the beginning.

The collection of programs described in this tutorial is called the Tenex Electronic Notebook-Conference (TEN-C) System. Included in this "system" are the XED text editor, the MSG message handling program, the ZCONFER conferencing program (a modification of FORUM 5). These programs operate under the TENEX executive on the PDP-10 computers at the USC/Information Sciences Institute.

This description of the tutorial should provide the reader with a useful introduction to the Electronic Notebook and Conferencing capabilities offered by these programs. This document is not intended to fully substitute for live presentation of the training of the complete documentation of the individual programs.

CONTENTS

PREFACE

This report is intended for those who train new users of the computer programs described herein. It is not a training manual!

This report describes a tutorial for introducing novice users to a collection of computer programs which support interpersonal communication. The tutorial is designed to reduce the apparent complexity of the multiple command languages involved. The instructional strategy used provides a model for other training situations in which a collection of computer programs must be taught simultaneously.

The tutorial first presents concepts which facilitate understanding of the various command languages. This is followed by a series of exercises leading up to the new user's performance of a sample task involving a limited subset of all commands. The tutor monitors the new user's progress and offers advice. This approach puts the new user in an active, problem-solving role from the beginning.

The collection of programs described in this tutorial is called the Tenex Electronic Notebook-Conference (TEN-C) System. Included in this "system" are the XED text editor, the MSG message handling program, and the ZCONFER conferencing program. These programs operate under the TENEX executive on several PDP-10 computers at the USC/Information Sciences Institute.

This description of the tutorial should provide the reader with a useful introduction to the electronic notebook and conferencing capabilities offered by these programs.

The students for whom this tutorial was designed have a basic familiarity with online computers (particularly with the PLATO System) and have agreed to participate in an extended conference. The goals of the tutorial are for new conference participants to become self-sufficient and eventually sophisticated users of the TEN-C capabilities. This tutorial attempts to provide a solid introduction from which users would be able to keep on learning about the various programs on their own. This tutorial supplements, rather than substitutes for complete written documentation and on-line "Help" features of each of the TEN-C programs.

Several additional disclaimers should be made at the outset. First, these programs were not created by this author. The ZCONFER program, for example, is a modified version of the FORUM 5 program developed by Institute for the Future (Vallee, Lipinski and Miller, 1974). Readers who have used FORUM 5 will note in ZCONFER several minor changes in the conventions of the user language.

Second, these programs were not designed to be used together. They are remarkably consistent in convention, given the fact that they are being combined *ad hoc* for support of electronic notebook and conferencing activities.

Third, because these programs are frequently improved, no claim is made that conventions and commands will remain fixed over time as new capabilities are added. This document is not an official user's manual, but rather a progress report. Each of the programs is documented with an on-line Help feature.

Finally, the TEN-C System is admittedly *ad hoc* and in need of improvement. Despite the few inconveniences and inconsistencies, the TEN-C System is a powerful and effective means for computer-based teleconferencing.

ACKNOWLEDGMENTS: I am indebted to Bill Mann, Don Oestreicher, Ron Tugender, Rob Stotz, Dave Crocker, Alex Archbold and Rudy Bretz for comments on an earlier draft of this document.

LIST OF TUTORIAL HANDOUTS INCLUDED IN THIS REPORT

1. Orientation Outline
2. Concepts used in this tutorial
3. Review questions on concepts
4. Abbreviated User Manual
5. Review Questions on Commands
6. Sample Task Description
7. Review Questions on Sample Task
8. Tutorial Evaluation Questionnaire
9. ZCONFER Command Descriptions - Appendix 1

A. INTRODUCTION

The Tenex Electronic Notebook-Conference (TEN-C) System

This document describes a tutorial which is used to train new users of the Tenex Electronic Notebook-Conference (TEN-C) System at the University of Southern California's Information Sciences Institute (ISI). The TEN-C System is a collection of computer programs that facilitate interpersonal communication through exchange of text. The TEN-C System includes three distinct computer programs, each with complementary text processing and communication capabilities.

TEXT PROCESSING CAPABILITIES

Program	*Preparation*	*Distribution*	*Storage & Retrieval*
XED	strong	weak	weak
MSG	weak	strong	moderate
ZCONFER	weak	weak	strong

Figure 1. Relative Strengths and Weaknesses of TEN-C Programs

As you can see from figure 1, any of the programs *could* be used by itself to perform text preparation, distribution, storage and retrieval. We have found at ISI that for any extensive conferencing or electronic notebook activity, it is highly desirable to use all three programs, moving quickly among them to perform tasks most effectively. Consider the following scenario.

A Scenario of TEN-C Activity

You have been away from your office for a week's vacation. You return to find a few bills and personal letters on your desk. There are no phone message or office memos in sight. You turn on your computer terminal, login to the TENEX executive program on the computer and initiate the MSG program. This program automatically "reads" your online "file" of messages and notes all new messages received from other locations on the nation-wide network to which your local computer is connected. For each new message, the MSG program prints out the date and time received, the sender and a brief description of the subject. You scan this list of "message headers", note two of potential importance, and ask the program to print those two messages on the screen.

The first message is from one of your colleagues, announcing the completion of a draft of his chapter for a report you are preparing. Since he works in another branch of your organization located 25 miles away, he requests that you simply read and comment on the online version of the chapter. He specifies the "filename" which this chapter has, and notes that it is in his "directory" on the same computer.

The second message announces a meeting scheduled for 1 hour from now to discuss the progress on the report with your supervisor. You immediately respond to your supervisor's message by sending her one agreeing to the meeting time.

You next telephone one of your colleagues, Tom, who doesn't have his own terminal. You check on the status of his report chapter. He agrees to get a copy to you within a half-an-hour.

You have fifty-five minutes to review Joe's chapter and prepare for the briefing. (Your own chapters are, of course, already completed.) Joe's chapter is only five pages long so you don't bother to get a paper printout from the printer, which is located upstairs. Instead, you go from the MSG program into a text editing program called XED. This is done by typing one letter, "x"! You "read in" the file containing Joe's chapter and "view" a screen-full of lines on your terminal. As you browse through the chapter, one screen-full at a time, you find several statements which must be revised. Using the edit commands you alter the text as needed. After viewing the entire file containing Joe's chapter, you decide to add a few paragraphs, to provide continuity with your own chapter. You review the entire file. Satisfied, you exit from the editor, automatically creating a new "version" of the file in your file "directory". (Joe's version is still in his directory, unaltered.)

Since you initiated the XED program from the MSG program, upon quitting XED you return automatically to MSG. You now send a message to Joe, informing him of the changes, the new version of his chapter in your directory, and the meeting (which he need not attend). Since Joe works different hours than you, he probably won't get the message until later (unless, of course, he has a portable terminal at home.)

About this time you receive a message from Tom. MSG notifies you by printing out the header of this new message. You type the message and learn that Tom's chapter is completed and a listing is waiting for you at the lineprinter upstairs. You send him a message (since you don't know where he is using the terminal), thanking him.

You now quit the MSG program. This leaves you in the TENEX executive program. Using the "list" command, you print out copies of Joe's and your chapter on the lineprinter, you call your secretary and ask him to pick up the printouts for you.

You now have 40 minutes to prepare for the briefing. Since members of your project team have been conversing daily while you were away, you want to catch up on progress and decisions relevant to your report.

Fortunately, some of their discussions took place in the conferencing program so that a transcript would exist for later reference. You initiate the conferencing program by typing ZCONFER and "join" the conference titled *This Month's Project Notebook.* This conference has only two topics; "the progress report" and "plans for future research." You go to the first topic. All "entries" by other "participants" that are new since you were last in this topic of the conference are printed out on your screen, one pageful at a time. You read them, add an "entry" responding to several questions raised by Tom, and add an entry noting that you have copies of Joe's, Tom's and your chapters which you are taking to a briefing for your supervisor. No one else is currently using the conference so your entries are just stored away under topic one.

Your secretary brings in the listings and you note that the meeting is scheduled to begin in only 30 minutes. You read through the printouts, making notes in the margins. Out of the corner of your eye, you note activity on your terminal screen. Joe has joined the conference. He sends you a "private message" in ZCONFER, thanking you for the improvements to his chapter. He has received your message and has read the version of his chapter which you created. This private message is not stored in the permanent transcript of the conference. Only public messages are labelled and stored. You enter a (public) message indicating that you will use ZCONFER at 3:00 p.m. that day to report on (and discuss) the results of the briefing. Joe responds with a private message "OK, good luck!" and leaves the conference. You quit the conference also.

You next use the editor to compose an announcement of the 3:00 p.m. ZCONFER discussion and "send" it to all members of your project with the SNDMSG command in XED. You quit XED logout of the system, and spend the next 15 minutes reading *Science* magazine before going to your briefing.

This scenario represents typical use of TEN-C by an experienced user. All those activities could have occurred in less than 45 minutes. Note the variety of communication media used. MSG was used to send announcements, like mail. It is assumed, on this project, that everyone checks his or her mail periodically when in the office. The editor XED was used to compose and even to view any text more than a few lines in length. Lengthy messages were sent directly from the editor. The specially-structured message file was not viewed with XED, but with the specially-designed MSG program, which keeps track of which messages are old-new, viewed-not viewed, and permits selective typing of messages. The ZCONFER program was used for conversation and reporting of a permanent nature. The telephone was used whenever possible and reasonable. The briefing to the supervisor involved face-to-face meeting with paper printouts that could be quickly browsed through and marked up.

Clearly, no one mode of communication and no one program was capable of handling all of these information processing activities with such ease and efficiency. Knowledge and use of less than a dozen different computer commands were necessary to carry out the entire 45 minute work session. This tutorial is designed to prepare a new user to do all of the tasks described in the above scenario.

The Evolution of TEN-C

The FORUM conferencing program has been in use at ISI since July of 1973. It is being used as a project notebook for several ARPA-sponsored research efforts, as a real-time teleconference when staff are out of town at planning meetings and need to get periodic advice from their colleagues back at ISI, and as a transportation substitute in a six-month long research seminar.

In many cases, participants want to submit lengthy, carefully planned entries to the conference. Especially in report preparation, several drafts of a section may be prepared and circulated before being submitted to the conference transcript. Once an entry is submitted to ZCONFER (or FORUM 5) it cannot be edited or deleted. Careless entry sometimes leads to a long-lasting embarrassment. For these reasons, we have found that use of a text editor is very important. Participants in all ISI conferences are encouraged to prepare any lengthy entries or position papers in the text editor mode of XED so that they can be carefully checked and perhaps revised before submission to the transcript.

At the other extreme, announcements which must be read and perhaps responded to by all participants seem to be best handled by a mail-type program such as MSG, rather than by the private message capability of ZCONFER. The MSG program facilitates answering, forwarding and sorting of messages into personal online files for storage. Furthermore, MSG has a command to switch into XED mode. XED has a command to "send the current file as a message." These three programs: ZCONFER, XED and MSG work together to provide a rich electronic notebook and conferencing support system [1].

The TEN-C System is currently operating on several PDP-10 computers at the University of Southern California's Information Sciences Institute. Use of TEN-C is limited to those with regular accounts on the USC/ISI computers. From time to time, teleconference workshops may be arranged as a part of research sponsored by the Advanced Research Projects Agency (ARPA). Invited participants may be authorized to use guest accounts for such TEN-C activity.

ARPA-sponsored researchers who are seriously interested in using TEN-C should contact Dr. William C. Mann at ISI. There is currently no funded support for the TEN-C system, per se. Its existence and the tutorial described in this document grew out of internal need and daily use by about a dozen researchers at ISI.

A commercially available service comparable to TEN-C is offered by the Institute for the Future. Contact Jacques Vallee at 2740 Sand Hill Road, Menlo Park, California 94025, for further information on the FORUM program.

The Need for this Tutorial

The various programs which make up the Tenex Electronic Notebook Conference (TEN-C) were designed to be used separately. Their user manuals present them as separate programs. Together, they contain just over 100 commands in their user languages. Even with a well-thought out user manual for each program, this can pose an overwhelming learning situation for a new user. One need for this tutorial was to reduce the apparent complexity of this collection of programs down to a level where a few hours of training would leave the new user confident and able to learn the remaining command capabilities at his or her own pace.

A second purpose for the tutorial was to permit efficient and effective on-site training of new TEN-C system users for a teleconference that was being planned as part of an ARPA sponsored research effort. This training was to involve one or two users at each of a dozen sites around the United States. We decided that a written user manual was not likely to be successful and that the online tutorial features of the separate programs were not sufficient. The students for whom this tutorial was designed had a basic familiarity with computers (the PLATO system in particular). The goals of the tutorial were for new conference participants to become self-sufficient and eventually sophisticated users of the TEN-C capabilities.

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[1] The XED text editor was designed and programmed by Donald Oestreicher and Ronald Tugender at the University of Southern California/Information Sciences Institute (ISI). The MSG Message handling program was developed at ISI by John Vittal. It is an extended version of the BANANARD program, created by Marty Yonke at ISI. The idea for MSG came from early work done by Barry Wesseler at Bolt, Beranek and Newman, Inc. ZCONFER is a version of the FORUM 5 conferencing program developed by the Institute for the Future, to which Lee Richardson, at ISI, has made a few modifications. The TENEX Executive program for use on Digital Equipment Corporation's PDP-10 computers is available from Bolt, Beranek and Newman, Inc.

Complete users manuals for both XED and MSG are available online as the programs are used. These programs are periodically revised, so readers should check before taking the summaries and discussion within this tutorial as gospel truth.

Complete understanding of ZCONFER is best obtained from the "Forum User Guide" which is included as an appendix to the report by Vallee, Lipinski and Miller (1974), titled "Group Communication Through Computers, Volume 1: Design and Use of the FORUM System". That report also provides an excellent background on and several examples of teleconferencing with the FORUM-like (ZCONFER) portion of the TEN-C System.

The TENEX Executive Language documentation is available from Bolt, Beranek and Newman, Inc. (Myer and Barnaby, 1973 and Burchfiel, *et. al.*, 1975.)

A Brief summary of the ZCONFER command is included as an appendix to this document.

B. INSTRUCTIONAL DESIGN STRATEGY

The instructional design strategy has the following components:

1. ***Identification of the important commonalities and differences among the programs.*** A conceptual structure is presented in which the programs are treated as "modes" within a single overall system, TEN-C. Conventions which hold for all modes are presented first, with exceptions and unique functions presented later.

2. ***Preparation of the student to understand the documentation provided online for each program.*** Conventions used in online help facilities are introduced so that the new user will feel comfortable in using those facilities to keep on learning about TEN-C after the tutorial. Emphasis is placed on the introductory scope of the tutorial, and the importance of exploration and learning new command features *as the need arises* in use of TEN-C.

3. ***Reduction of complexity to a manageable level.*** The structure of TEN-C, conceptually, is hierarchical. The number of command modes and the number of options within each mode are minimized. The *Abbreviated User Manual* encourages students to recognize the importance of being in one mode rather than another.

We have found that many frustrations of new users are due to repeated attempts to execute a command in the wrong mode.

With a complex time sharing system such as TENEX, it is not safe to assume that a cookbook procedure will suffice to keep users out of trouble. This tutorial attempts to introduce a few concepts that will help new users diagnose their own problems and utilize "Help" facilities to the maximum extent.

Printed user manuals exist and are typically provided to students for reference purposes and for study after they have gotten familiar with the operation of the TEN-C programs. Since few new users (in this author's experience) have taken the time to study long manuals before beginning, this strategy is likely to lead to increased overall use of the user manuals.

4. ***Stress direct experience rather than vicarious experience.*** The tutor does not show the student how to use the system. Rather, he or she answers questions and makes suggestions designed to get the student to *learn* what to do at first and as difficulties arise.

5. ***Employ learning to criterion for mastery of important concepts.*** There are three stages of concept attainment in the tutorial. The first involves basic concepts such as "file," "mode," and "hierarchy."

The second stage involves understanding what basic commands are available in each of the modes and what each command does. The third stage integrates the first two in

actual use of TEN-C to perform a carefully specified scenario of tasks. There is a set of review questions for each stage. If the student has trouble with any question, he or she is encouraged to reread the handouts or consult documentation until the correct answer is found.

This interaction between tutor and student may be crucial to the success or failure of the tutorial. It seems premature to attempt to replace it with a computer program. Hopefully, this can be done eventually. In the meantime, tape recordings of tutorials are being kept for future analysis should such a CAI effort be undertaken.

C. *HOW THE TUTORIAL IS PRESENTED*

The next section of this paper contains a written description of what is intended as a half-day tutorial on the use of TEN-C. The live tutorial involves a high level of interaction between the instructor and the student, especially in the use of review questions to test for concept and skill attainment. Some of this tutorial flavor is bound to be lost in this written presentation, due to the linear sequencing of text and the lack of a tutor (the instructor) to correct misconceptions that are typically revealed during the review question periods.

We considered preparing this tutorial as a "Programmed Text." While this would work well in print, the author believes that it would be a poor means of teaching the use of a complex interactive computer system to highly-educated decision-makers and researchers. We decided to leave the human instructor in the loop. This paper is ***not expected to fully substitute*** for a live tutorial, but should be considered as a report describing such a tutorial.

The tutorial can be presented in a one-on-one tutor-student format as well as to small groups. The review questions are somewhat less effective with groups since there is no check on each individual student for each question. The dialogue between tutor and student is valuable in either format and greatly reduces the need for reading on the student's part.

The only reading done during the tutorial is of the handouts which are presented one at a time. These are all reproduced and discussed in the next section of this paper.

The instructor-tutor follows a specific scenario for all tutorials. This assures that information is presented in a reasonable order for incorporation and mastery by the student. This ***Instruction Scenario*** is reproduced below. The remainder of this paper is organized by the steps in this ***Instruction Scenario***. Handouts are reproduced, verbatim, on separate pages, with running commentary on each step in the scenario.

Instruction Scenario For The TEN-C Tutorial

1. Instructor: Check to see that the terminal is working properly and that you can access the net to the ISI computer. Login. Read your mail. Logout.

2. Instructor: Check to see that all necessary learning and documentation materials are at hand.

3. Instructor: Begin tutorial with orientation to the learning process. Handout "Orientation Outline."

4. Instructor: Hand out "Concepts Used in this Tutorial".

5. Student: Read "Concepts Used in this Tutorial" and ask questions of instructor.

6. Instructor: Check comprehension by asking student the review questions for "Concepts" <cf Review Questions - in next section> Have the student reread the handout until answers are correct.

7. Instructor: Hand out the "Abbreviated User Manual".

8. Student: Read through and ask questions about commands.

9. Instructor: Check comprehension of commands by asking students the review questions. <cf Review Questions>

10. Take a break prior to use of the TEN-C System.

11. Student: Review "Abbreviated User Manual".

12. Instructor: Hand out "Sample Task Description" to the student.

13. Student: Read through the "Sample Task Description." Login to the system.

14. Student: Go through the exercise with the instructor present. Ask questions as necessary. Learn by trial and error as much as possible.

15. Instructor: Hand out "Protocol of Successful Task Completion" and review with student.

16. Take a second break.

17. Instructor: Check comprehension by asking review questions. <cf Review Questions>

18. Instructor: Hand out the "Tutorial Evaluation Questionnaire".

19. Student: Complete questionnaire evaluating the tutorial.

20. Instructor: Hand out the documentation notebook and the certificate of course completion.

21. Instructor: Encourage the student to arrange to LINK to an experienced TEN-C user the first few sessions to insure availability of online assistance.

D. TUTORIAL AND COMMENTARY

This section of the paper presents a running commentary on the tutorial. This commentary is organized by the steps in the ***Instruction Scenario***, which was presented and discussed in the previous section.

1. To avoid embarrassment and waste of student time, the instructor always checks the availability of the computer system immediately preceding the tutorial. This is a good time to check for new messages relevant to TEN-C use or training. This is done without the student present to avoid setting up a mystery-mastery tone for the tutorial. The instructor logs out of the system since it will not be used in the first part of the tutorial. If a tape recorder is to be used, it is checked at this time. The instructor also checks to see that he or she has the ***Instruction Scenario*** and the ***Review Questions.***

2. Handout materials are arranged in order of presentation. These include:
   1) Orientation Outline
   2) Concepts Used in this Tutorial & Review Questions
   3) Abbreviated User Manual & Review Questions
   4) Sample Task Description & Review Questions
   5) Protocol of Successful Task Completion
   6) Tutorial Evaluation Questionnaire
   7) Documentation Notebook, including
      XED Manual
      MSG Manual
      ZCONFER Command Summary
      TENEX-Notes on use
      Login Scenario appropriate to
      local situation
   8) Certification of course completion

3. The orientation begins with a very brief verbal introduction, such as the following:

   "This tutorial is designed to ***facilitate learning*** rather than to ***teach.*** As a beginning user, you are encouraged first to master a few basic concepts, which are essential to understanding how the programs are documented and operated; then to experience TEN-C directly. Learning will thus be through trial and error rather than through memorization of ***cookbook*** procedures. As your instructor-tutor, I will not "show" you how to use the TEN-C System. Rather, I will stand by to answer questions as the new concepts are applied and problems arise. This approach is consistent with everyday use of online interactive systems. It is nearly impossible to plan for all contingencies in the documentation and training for a complex system.

   "The goals of the tutorial are for you to develop self-confidence and self-sufficiency to deal with the problems that will inevitably arise and for you to progress from a simplistic view of ***how TEN-C works*** to a creative view of ***what you can do with it.***"

The instructor then hands out the *Orientation Outline* (shown below) and reads through it with the student to make sure the process is understood and agreeable to the student.

4. The instructor hands out the *Concepts Used In This Tutorial* (shown below) and reads through the handout with the student.

5. The student reads the *Concepts* handout. Comments and questions are encouraged by the instructor. These serve to establish links between the student's prior knowledge and expectations and the new information being presented. A tape recorder is used, whenever possible, to record this part of the tutorial for later analysis of questions and answers.

6. The instructor asks the *Review Questions* (see below) which pertain to *Concepts*. The student is encouraged to look up correct answers in the handouts for any missed questions. Misunderstandings get clarified and resolved at this time. Students also typically ask many questions about these and other related concepts at this point in the tutorial. The tutor answers questions as long as they do not get too far off the path.

7. As soon as the student can answer the *Review Questions for Concepts*, the instructor hands out the *Abbreviated User Manual*. (see below.) This manual contains one or two pages per command mode; summarizing the conventions and basic commands for each mode on one page and the submode options on a second page when necessary. This manual can be marked up by the student as questions arise and get answered. It then becomes a personalized introduction. Reference can be made to the one or two pages for whichever mode is in current use by placing the manual next to the front of the terminal.

8. The student reads through the *Abbreviated User Manual* and asks for clarification of terms that are not immediately obvious. This is, perhaps, the most important and yet highly variable step in the tutorial. Students are not given full documentation on the various programs at this time. They are reading a highly abridged description of the several command languages. This reduces the quantity of information to be read (passive learning) and increases the amount of information for which the student must ask the instructor (active learning.) This step is particularly difficult for a person who is trying to learn to use TEN-C by reading this report, rather than by taking the tutorial with an experienced instructor.

9. The instructor, at the risk of losing the student's faith and cooperation, goes through the *Review Questions for the User Manual* (see below.) By this time students are typically tired, if not confused as well.

10. A much needed rest break is taken at this point in the tutorial.

11. Following the break, the student briefly reviews the user manual and asks any new questions. The instructor will complete the *Review Questions For the User Manual* if these were not completed before the break.

12. The instructor hands out the *Sample Task Description* (see below) and reads through it quickly with the student.

13. The student briefly reads through the *Sample Task* and then goes through the login procedure with the "advice" of the instructor. The student typically takes "recipe-type" notes at this point. It seems important to note how to turn on and adjust the terminal, how to dial up and connect to the computer or TIP port, how to get connected to the appropriate computer at ISI, and how to login. Since this information varies from location to location, it is not part of the formal handout to new users. Personalizing this procedure into their own handwriting seems to be important to most students.

14. The student next goes through the *Sample Task*, often asking advice of the instructor. Students are generally willing to think out loud and don't mind their decision-processes being tape recorded. This is often the most important opportunity for the student to acquire insight into the interrelationships among the TEN-C programs. Students may realize that there are several ways to perform some of the tasks. The tasks are designed to encourage use of every command in the *Abbreviated User Manual* at least once. The instructor may, occasionally, need to suggest the appropriate command for a task, if the student runs into trouble.

    The main objective of this step is for the student to gain self-confidence in use of the programs.

15. After the student has completed the task, the instructor hands out and reviews a *Protocol of Successful Task Completion*. At this point, the instructor can discuss strategic issues; such as which program is best used for particular types of tasks, under particular situations. (For example, XED or MSG may be a faster and more reliable way of sending important or long messages than is ZCONFER, unless of course the recipient(s) are currently participating in ZCONFER.)

16. A second rest break is taken at this point.

17. The instructor next asks the *Review Questions For Sample Tasks*. This provides one last opportunity within the tutorial for the student to integrate what has been learned and discover remaining ambiguities and misconceptions.

18. The instructor hands out the *Tutorial Evaluation Questionnaire*. This provides the student an immediate opportunity to make complaints and suggestions for the improvement of the tutorial. This questionnaire also records background information about the student which may later be useful in interpretation of the evaluation or in description of the user population for a project's use of the TEN-C System.

19. The student may want to repeat, in writing, criticisms and suggestions made during the tutorial. Upon completion of the evaluation questionnaire, the tutorial is finished.

20. Finally, the student is given a notebook containing documentation for the ZCONFER, MSG and VED programs. The earlier handouts are perforated and fit into the notebook as well. Since the reference manuals for all of these programs are maintained up-to-date online, they are not included in this report. They are, however, given to graduates of the tutorial, since graduates will know to keep up with the online notices of changes in the programs.

21. The instructor typically arranges for students to have some form of expert assistance available during the next few sessions in which TEN-C programs are used. Inevitably, there will be problems and questions that did not come up in the training.

The remainder of this section of the document contains copies of the handouts given to students during the tutorial.

ORIENTATION OUTLINE

1. This is a complex learning task, but easily managed in this half day tutorial.

2. I, (your instructor) am available only once for a short time.

3. My goal is for you (student/user) to quickly become confident and self-sufficient as a learner of these new computer facilities, TEN-C.

4. The form of learning will be "conceptual and experiential," so that you will be able to learn on your own, as much as possible without any help.

5. This tutorial includes live instruction, an "Abbreviated User Manual" of basic program commands and conventions, online documentation, and hard copy documentation.

6. If this approach to instruction works well, we may write a CAI lesson to play the part of the instructor and to facilitate interaction with the online documentation.

7. Your comments on this instruction are important to us and questionnaires are provided for you to record them at the end of this session. We would be grateful if you would use a tape recorder throughout the tutorial to record answers for the review questions, suggestions for improving the tutorial, and questions you have.

8. You may ask any questions as we go along and you may want to note any problems you have with the documentation.

9. Any questions so far?

10. The remainder of this session will proceed as follows:
    a) You will read an introduction to "Concepts Used In This Tutorial."
    b) I will ask you some questions to be sure you fully understand these basic concepts before you go on.
    c) You will read through the "Abbreviated User's Manual."
    d) I will ask you questions again, to be sure that you understand how to use the commands.
    e) These question-answer sessions are intended to get you to USE the concepts and commands prior to sitting down at the terminal so that we can discuss them more fully than the user manual does.
    f) You will then log in at the terminal and go through some ***Sample Tasks***, with me here to assist you.
    g) There is a final set of review questions, pertaining to the sample tasks.
    h) You evaluate this training on a questionnaire.
    i) You receive a certificate of completion for the tutorial.

CONCEPTS USED IN THIS TUTORIAL

In order for you to become a proficient and confident user of TEN-C, you will need to understand a few basic concepts which are used throughout the remainder of this tutorial. They were selected as the minimum essential for you to be able to "learn" (eventually by yourself) how to use the TEN-C System on the computer at the USC/Information Sciences Institute. It is important that you understand these concepts before beginning to use TEN-C.

TEN-C: The Electronic Notebook-Conference System is a collection of programs on the ISIB computer. These programs are referred to as

- TENEX (PDP-10 Executive) Language,
- XED (Experimental Editor) with which you can create and edit files of text,
- MSG (Message Handling Program) for sending, receiving, reading and storing files which are in a message format,
- ZCONFER (Conferencing Program) which is used to create and access the notebook-conference transcript.

ARPANET: a digital communications network connecting more than 90 computers throughout the United States, Norway, and England (see Figure 2). Network lines can transmit information at a rate of 50,000 bits per second, permitting real-time access to any ARPA Host computer from any point on the NET. The ARPANET is accessed either via a TIP (and the TIP User Language) or from a computer via TELNET (and its user language). Figure 3 shows a geographic map of the ARPANET.

MODES: are programs. This term is used to distinguish the "environments" or "contexts" in which user commands are interpreted. Within TEN-C, each mode (program) has its own "command interpreter." Some modes in turn, have "submodes". For example, ZCONFER is a mode within TEN-C System and INPUT is a submode within ZCONFER. Typically it is necessary to formally "enter" a mode; for example, by typing ZCONFER. Only commands appropriate to the current mode, whatever it is at any given time, will be recognized and executed. There is typically an identifying prompt unique to each mode. Figure 3 shows the relationships between modes, each of which accepts a particular set of commands. The "Abbreviated User Manual" is organized according to these modes, listing the commands and conventions unique to each.

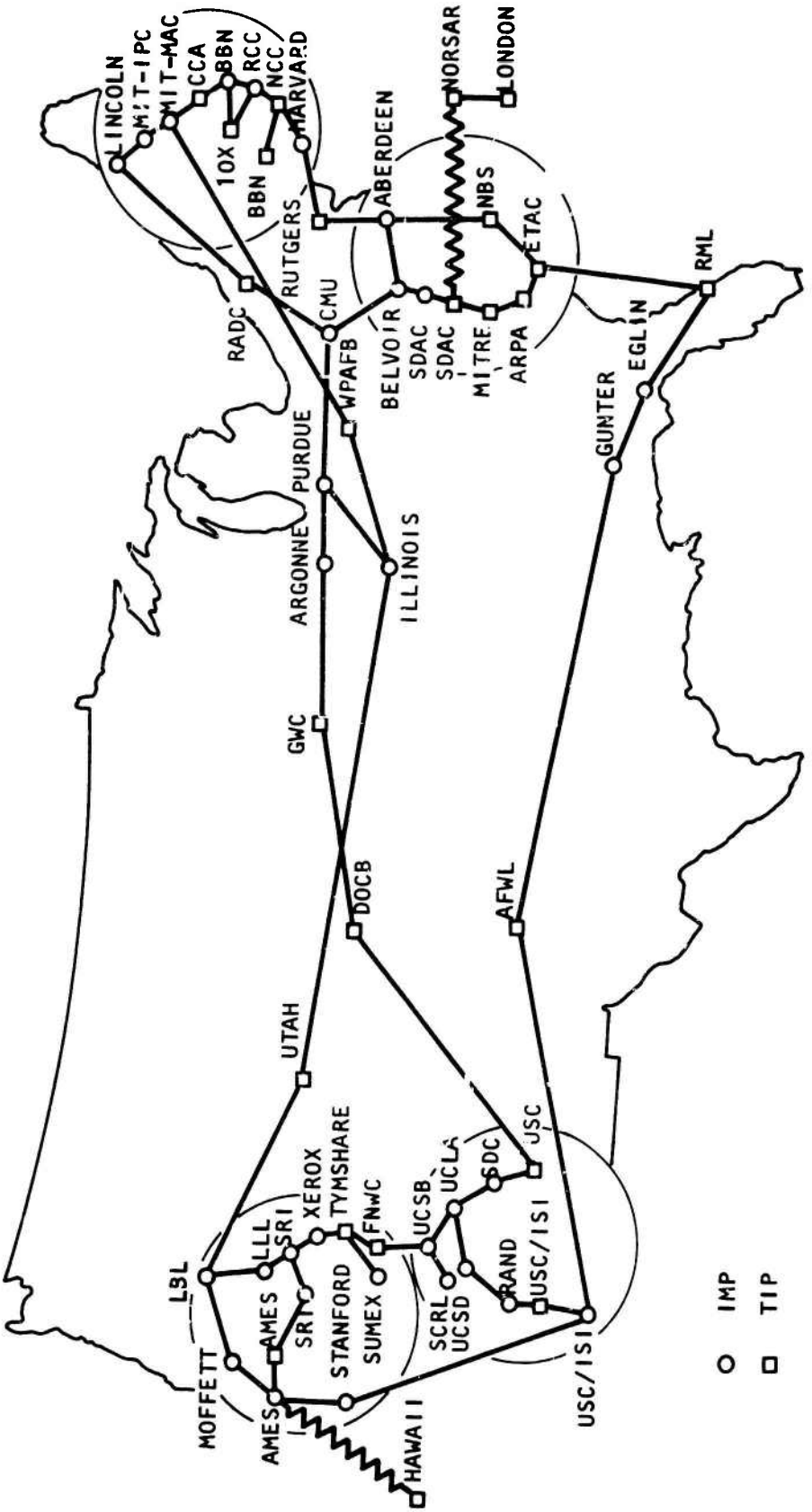

Figure 2. ARPA Network, geographic map. April 1975

HIERARCHIES: tree-like, branching structures. Command modes and submodes are arranged in a hierarchy (see Figure 3). Within ZCONFER, the conference topics, and activities are arranged in hierarchies. Generally, the lines of a hierarchical diagram indicate "commands" you must enter to get from one point to another.

COMMANDS: are recognized by each program. Only the most important ones are presented in this tutorial in the "Abbreviated User Manual." More comprehensive user manuals are provided at the end of the tutorial. In any mode (with the exception of INPUT submodes), typing ? will cause a list of all command options to be typed at the terminal. Commands can only be typed following a prompt from the current mode or submode.

CONVENTIONS: for each mode are listed on the respective pages of the "Abbreviated User Manual." Almost all TENEX conventions work in the XED, ZCONFER, and MSG modes. The TENEX conventions, at least, should be "memorized" prior to beginning use of TEN-C.

COMMAND RECOGNITION: a convention in this system which requires you to type only enough information (i.e., letters) to distinguish a command name from others available in the current mode. Typically this requires only one or two letters. In MSG and XED, the program ***automatically*** recognizes a command after a single letter has been typed. The other modes (TENEX and ZCONFER) have a ***manual*** command recognition option. You may either type all letters in the command or you may type at least the minimum necessary letters followed by hitting the [ESC] key. This causes the program to complete typing the command name and specify any "parameters" necessary. If the program responds with a BELL or BEEP when you hit [ESC], that means more information is necessary to distinguish the command. The [ESC] key may also be used for FILE-NAME recognition. ***Note***: Some terminals have an [ATTN] key which corresponds to the [ESC] key in this documentation. Keys on the terminal are indicated in the documentation by the [square brackets].

COMMAND COMPLETION: is sometimes requested by the program. To indicate to the computer that you have specified a parameter value or have fully specified a command and that it is ready to be executed, you have to hit the [CR] key. Sometimes the program will explicitly request you to "CONFIRM" the command as specified. Use the [CR] key. ***Note***: Some terminals have a carriage return [CR] key labeled as [RETURN].

PARAMETERS: are variables within a command specification. Some commands have parameters which are optional; some must be specified. Typing a ? will typically get you a list of parameters inside a command specification. Parameters are indicated in the documentation by the words in <ANGLE> brackets. Generally you have to type what is in capital letters and substitute a value for the parameters indicated by brackets. Do not type the brackets themselves.

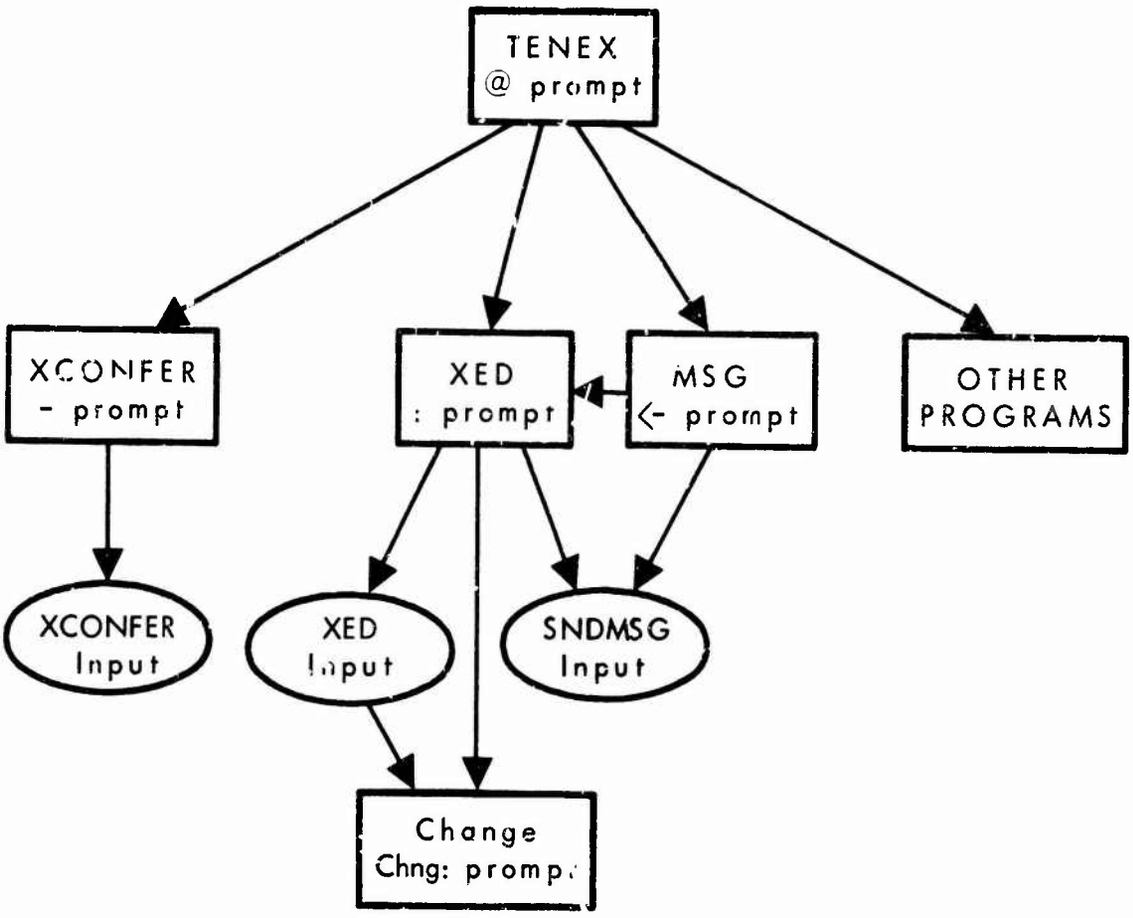

Figure 3. TEN-C command modes. Modes have commands and prompts and are represented by boxes; input submodes are represented by balloons.

For example, <Put <MESSAGE-SEQUENCE>[CR] into file: <FILE-NAME> [CR]

Might look like Put (entries) 1-9, 13 [CR] into file: LPT: [CR]

Note that only the characters P 1-9, 13 [CR] LPT: [CR] would actually be typed. The system filled in the rest of the characters (ones in lower case). This is an MSG command which would put the specified messages out onto the main line printer. Note that command completion [CR] is necessary to indicate the end of each parameter specification. MSG has "automatic command recognition" (see above.)

DOCUMENTATION CONVENTIONS: as follows are used throughout this tutorial, in the Abbreviated User Manual, and in the online help facilities.

CAPITAL LETTERS = what you must type in issuing a command

lower case letters = what the program will type to complete the command specification or to prompt you for more information.

[SQUARE BRACKETS] = a special key to be hit

<ANGLE BRACKETS> = a parameter for which you must/may specify some value(s)

(parentheses) = nothing special. Part of the way the system prompts for information.

FILE NAMES: can be specified by typing at least the minimum number of unique characters followed by hitting an [ESC] key. For example, if you have only a MESSAGE.TXT;1 file in your directory, then typing the letter "m" and hitting the [ESC] key will specify it. The computer always types out the full name for your confirmation, [CR]. Some special filenames are:

message.txt - never edit this, it is read automatically by MSG.

lpt: - send to the lineprinter at ISI, rather than to a file.

tty: - send to this terminal, rather than to a file

In response to a prompt for a file, you can specify a new file. The program will inform you whether any file name is new or old and request confirmation. Hit [CR] key to confirm. Hit [DEL] or [RUBOUT] to abort the specification. The structure of a filename is "FILENAME.FILETYPE;VERSION NUMBER". For example, you might name a file "junk.text;1". Any short string of characters can be used for a filename or filetype.

REVIEW QUESTIONS FOR CONCEPTS

The concepts presented above are essential to your understanding and use of TEN-C. They enable you to learn experientially and to take advantage of the online documentation and user manuals.

Before going on with the tutorial, you should be able to correctly answer the following Review Questions. Refer to the preceding discussion of "Concepts," if necessary, to be certain that you have "mastered" these concepts.

1. What is a mode?

2. How do you know what mode you are in?

3. When can you use the TENEX conventions?

4. What is command completion? How is it done?

5. If you hit [ESC] after typing the first letter of a command and a bell rings, but no prompt appears, what does this mean?

6. How do you get help when the above happens?

7. How do you get a listing of parameter options?

8. In the documentation, what do square and angle brackets and parentheses indicate?

ABBREVIATED USER MANUAL

The Electronic Notebook-Conference (TEN-3) System

CONVENTIONS:

Each mode (environment for entering commands) is summarized on one page.

Commands with complex options or subcommands are described in detail on an adjacent page.

Conventions unique to each mode are listed before the commands on each page.

Not all commands in each mode are listed here; only the most important ones.

DOCUMENTATION CONVENTIONS (for these cards and for online explanations):

[FUNCTION] - square brackets refer to a function key on the terminal.

<PARAMETER> - angle brackets mean you substitute a value for the parameter.

UPPER CASE - refers to what you must type for the program to recognize the command

lower case - refers to what the system will type

[↑C] - is read as "control C." To enter [↑C] hold the CNTL key down and type the [C] key. The ↑ refers to [CNTL].
NOTE: A few terminals have a key with [↑] on it. Do NOT confuse this with the [CNTL] key.

MODES: (and corresponding prompt)

TENEX	MSG	XED	ZCONFER
@	<-	:	

TENEX Executive System (for PDP-10 Computer) MODE
@ prompt by system

CONVENTIONS: (these hold also for XED, ZCONFER and MSG modes.)

[DEL] or [RUBOUT]	abort command (prior to executing it with [CR], except in XED mode; negative confirmation)
[↑C]	abort program; return to @ prompt in TENEX mode
[↑A]	character delete (also [↑H] and [BACKSPACE])
[↑W]	word or string delete
[ESC]	command completion character; except in XED mode.
[↑R]	retype line being input
[CR] or [RETURN]	command termination; positive confirmation
?	list of local options

COMMANDS: (a small subset of all TENEX commands)

DIRectory	lists files in your directory
LOGIN <NAME> <PASSWORD> <ACCT>	
LOGOUT	leaves TENEX, return to TIP mode
MSG	invokes message mode
TERminal <TYPE>	specifies terminal type (? for options)
XED	invokes text editor mode
ZCONFER	invokes conference mode

MSG (Message Processing System) MODE
<- prompt

CONVENTIONS: (two submodes: inputting messages (SNDMSG) and executing commands)

Type only the first letter of each command. Wait. The system will type out the rest and prompt you for additional information. Hit [CR] only at the end of the command. ? gets help.

<FILE-NAME> - any name. LPT: and TTY: used as file names send output to the lineprinter or your terminal, respectively. You may create a filename for a new file.

<MSG-SEQUENCE> - any integer or several integers separated by "-," ">", or, < . These numbers are used to refer to messages. There are other mnemonic options, such as "A" for "all messages."

All TENEX conventions hold, in addition to

[↑Z] - indicates end of message input
[↑O] - aborts terminal output or message input, returns to <-
[CR] - command termination character and positive confirmation
[↑Q] - deletes current line of message text input
[↑S] - retypes entire message entered so far
[DEL] - aborts SNDMSG; return to <- in MSG mode (also [RUBOUT])

COMMANDS: (a small subset of all MSG commands)

E exit and update old file	
H headers All	list headers of all messages
P put <MSG-SEQUENCE> into file: <FILE NAME>	put a copy of messages there
Q quit	don't update msg file
T type <MSG-SEQUENCE>	type on terminal
V verbose	give verbose prompts
X xed	go into XED mode

XED (Text Editor) MODE
: prompt

CONVENTIONS: (three submodes: inputting text, executing commands, and changing a line)

Type only the first letter of the command you wish to execute. XED will complete the word and wait for parameters or execute the command if there are no parameters.

XED maintains a "pointer" to a "current line." All commands operate on that line and below in the text file. Typing a number BEFORE a command name moves the pointer to that line before executing the command. Numbers FOLLOWING a command specify the number of lines to be affected by the command, e.g., "9k5" will kill lines 9 THROUGH 13.

Command recognition is automatic in XED. The editor acts on the first character of a command and waits for parameters, subcommands, or [CR] confirmations, if any are required.

XED will maintain for each user a "profile" of terminal characteristics and conventions preferred by the user. Type a double quote (") as an XED command to initiate the question-answer sequence which creates this MODEFILE. All other TENEX conventions hold, in addition,

[DEL] - character delete
[↑X] - deletes current line being input
[↑Q] - aborts a partially specified command
[↑O] - aborts an executing command
[↑Z] - terminates text input mode; return to : prompt
in XED command mode

COMMANDS:

? command menu
A append new input
C change line (see SUBCOMMANDS*)
E exit and save file: <FILE-NAME>
F find string of text <STRING>
% send text file as message

H<letter> explains command of "letter"
K<NUM> kill one or more lines
Q quit XED; return to previous mode
R read in file: <FILE-NAME>
T<NUM> type one or more lines
V view 16 lines from current <FILE-NAME>

[+]<NUM> forward NUM lines
[↑] print previous line
[LF] print next line

[-]<NUM> backward NUM lines
[/] print current line

---

*SUBCOMMANDS for the CHANGE submode are listed on the next page.

SUPPLEMENT TO XED - CARD 2

C CHANGE command is used to alter the current line of text. Typing "C" puts you in a submode where the following subcommands are used to 1) copy characters from the old line into the new line ([SPACE],E,S) 2) delete characters from the old line (D,K,R) and 3) add characters to the new line from the keyboard (I,R). All <NUM> parameters default to 1, if not specified. <CHAR>s default to [SPACE].

SUBCOMMANDS:

?	prints a list of subcommands
<NUM>[SPACE]	spaces N characters forward, copying old to new as is
B	breaks line and inserts new line
<NUM>D	deletes N characters forward from old copy
E	move to end of old line copying old to new as is.
I	insert following text until [CR],[LF] or [↑Z]
<NUM>K<CHAR>	delete until Nth occurrence of CHAR
P	print remainder of old line and new version of current line.
<NUM>R	delete next N characters and enter INSERT mode (above)
<NUM>S<CHAR>	copy forward until Nth occurrence of CHAR
<NUM>V<CHAR>	invert case of all alphabetics up to Nth occurrence of CHAR
[CR] or [RETURN]	copy remainder of old line to new
[LF]	update current line to new, as is

ZCONFER (conferencing-notebook) MODE
- prompt

CONVENTIONS: (three submodes: listening, inputting entries, and executing)

All TENEX conventions hold, in addition,

[CR] or [ESC]	completes command or causes system to prompt for information
[CR][CR]	indicates that entry is complete; submits it to the database
[CR]	(as first character of a line) change between listen and command submodes
[DEL][DEL]	entry delete in input mode; skips to next entry when text is being displayed
[↑O]	cancels typeout for entire command
[↑S]	retypes entire entry up to that point in input

? lists options ***within*** a command as well as ***overall*** command options.

COMMANDS: (a subset of all ZCONFER commands)

AGenda	lists Topic and Activity hierarchy
CHange (password) <NEW PASSWORD>	
GO (to activity)<NUM>	move among activities
Quit	graceful exit from ZCONFER to TENEX
REView (entries)<OPTION>	see next page for OPTIONS list
STatus (of participants)	tells where in the hierarchy participants are active
SUbmit (file)<FILE-NAME>	gets a file from your directory, created earlier with XED

SUPPLEMENT TO ZCONFER - CARD 2

Describe *<COMMAND-NAME>* - provides online documentation of these plus the following additional ZCONFER commands: Put, SAve, Next, ACtivity, COnference, Exec, REStart, STatus. "Describe ALL" prints a description of ZCONFER commands on your terminal.

REView *(entries)* *<OPTION(S)>* - retrieves and displays the discussion entries you specify.

Put *(entries)* *<OPTION(S)>* ***into file:*** *<FILE-NAME>* - outputs the specified entries into a file (which you can then edit and list, for example).

OPTIONS: The following OPTIONS can be used, alone or in combinations, with either the Put or the REView command:

BY <a list of participant names (or the word ALL)>
IN <a list of entry numbers (or the word ALL)>
LAST <NUM> entries; to see only the previous entry, simply type
LAST
BEFORE, ON or AFTER <a date such as 17-APR-73 or 5/17/73>
BETWEEN <a date> AND <another date>
RE <a topic word in quotation marks>; e.g., RE "energy"

In addition, if you do not wish to see the heading and complete text of the entries you have specified, you may use any of the following restrictions:

BY FIRST LINE
BY FIRST <NUM> LINES
NO HEADING
NO TEXT

SUMMARY OF COMMANDS IN TEN-C TUTORIAL

TENEX: (@ prompt)

directory	terminal
login	xed
logout	zconfer
msg	

MSG: (<- prompt)

exit	type
headers all	verbose
put	xed
quit	

XED: (: prompt)

append	quit
change*	ead
exit	type
find	view
help	write
kill	%

*CHANGE SUBCOMMANDS: [space], end, insert, delete, copy old to new, [LF], break line, search forward, print, replace, invert

ZCONFER: (- prompt)

agenda	review**
change	status
go	submit
quit	

**REVIEW/PUT OPTIONS: by, in, last, before, re, no text

REVIEW QUESTIONS FOR ABBREVIATED USER MANUAL

You are probably now suffering from an information overload. Don't worry! You can refer back to the pages of the Abbreviated User Manual to answer any of these review Questions.

It is important for you to review at least the following questions before going on to use TEN-C. As you go through these review questions feel free to ask questions of your instructor.

1. What are the four basic modes?

2. What is the prompt from the system for each mode?

3. Go through each command and guess what it does. <Instructor confirms or corrects each guess>

4. What are the eight TENEX conventions? <List these from memory> <HINT: abort command, abort program, delete character, delete word, command completion, retype line input, command termination, list options>

5. How can you go directly from each of these modes to the other: TENEX, XED, ZCONFER, MSG.

6. Are there any TENEX conventions which are not valid in all other modes?

7. From what modes (or submode) can you send a message to another user?

8. A much-needed rest break is taken at this point in the tutorial.

9. Following the break, the student briefly reviews the user manual and asks any new questions.

SAMPLE TASKS TO ACQUAINT YOU WITH USE OF TEN-C

The following sequence of tasks will lead you through use of the four basic modes of TEN-C.

This is the most critical step in the tutorial; where you first ***apply*** the concepts, conventions, and commands learned up to this point. This experimental step is designed to let you make some mistakes at first and go on to develop a sense of confidence in your ability to learn to use the TEN-C System.

1. Obtain assistance, if necessary, in order to login to the ISI-KI-TENEX computer, using your own account or the special account assigned to you.

2. Specify your terminal type to the system.

3. Check your mail to see if you have messages.

4. If you are using a special guest account for TEN-C, locate and typeout the message or messages about "first-time users." Otherwise, type out any message in your message file.

5. Put the oldest of the above messages into a file called <YOUR-LAST-NAME.TEXT>.

6. Go directly from MSG into the text editor.

7. Get into text input mode in XED. Type in a message to one of the people mentioned in the message you read earlier, identifying yourself, announcing your presence in the TEN-C System.

8. Send copies of the message to yourself (the account name you are using) and to others mentioned in the message. Do this while in XED.

9. Return to MSG, by typing quit to XED.

10. Type the new message while in MSG mode.

11. Use the XED editor again. Read in the file you put out from MSG called <YOUR-LAST-NAME.text>. If there is none, create a file with 10 lines of text.

12. View the entire file.

13. Type lines 3 and 4.

14. Put your name at the bottom of the file.

15. View the entire file again to check your editing.

16. If you made an error in placing the new line, then use the K command to kill it. Remember to specify the line number before the letter K. Now specify the line number for the end of the file and add the date after your name (on the same line).

17. From XED, invoke SNDMSG and send the message (i.e., the current file) to yourself. Stay in XED.

18. Save the file with the W command. To specify <FILENAME> hit the [ESC] key. This defaults to a new version number of the same name. If you created a new file, then give it a name here.

19. Find out what commands are available on XED.

20. Find out how to use SNDMSG (?) from XED, using the H command.

21. Leave the editor, gracefully.

22. Begin using ZCONFER.

23. Read all entries in Activity 1.1 of the conference which most appeals to you.

24. Make an entry in this activity.

25. Review the 3 newest entries in Activity 1.1.

26. Go to another activity. Review all entries there, aborting any that seem too verbose.

27. Put the message you created and saved as a file (in step 18) into the conference as a new entry in Activity 1.1.

28. Check the conference agenda and the status of other participants. Leave the conference, gracefully.

29. Print out a list of files in your account directory.

30. Edit the file with your message in it to state that you have now completed the introductory training for TENEX, XED, MSG and ZCONFER. Add comments regarding any serious problems you encountered.

31. From within the editor, send this file to the same people as before.

32. Leave the editor.

33. Log out of TENEX (and close the TIP connection if you used the TIP).

REVIEW QUESTIONS FOR SAMPLE TASKS

1. In what mode do you enter the system?

2. What mode do you enter next?

3. What are your options after logging into TENEX at ISI?

4. What similarities across ZCONFER, XED, MSG modes did you notice?

5. What differences among modes did you notice?

6. How do you get online help in each mode?

7. What is an entry? a message? a file?

8. What are topics and activities in ZCONFER?

9. How do you move among topics and activities?

10. What advantages are there in using all three of the programs XED, MSG and ZCONFER together?

11. What commands do you wish you could have that were not in the "Abbreviated User Manual"? How do you find out if they already do exist?

TUTORIAL EVALUATION QUESTIONNAIRE

1. Name:
2. Office:
3. Phone:
4. Terminal location:
5. Phone near terminal:
6. Names of other local users on ARPANET:
7. Date of training:
8. Trainer:
9. What previous experience have you had with:
   a. The ARPANET
   b. online conferencing
   c. text editors
   d. message systems
   e. TENEX systems
   f. PLATO system
   g. TUTOR author language
   h. other online systems

SCORE ANSWERS FOR EACH OF THE FOLLOWING QUESTIONS:

5 = extremely
4 = very
3 = average
2 = not very
1 = not all all
0 = don't know

10. How ***difficult*** overall was the training for you?-----

11. How ***successfully*** do you believe you learned to use each of the following:

    A. TENEX commands-----

    B. ZCONFER-----

    C. XED-----

    D. MSG-----

    E. TEN-C as a whole-----

12. How ***effective*** were each of the following for you:

    A. Handout on Concepts-----

    B. Abbreviated Users Guide-----

    C. Review Questions-----

    D. Sample Tasks-----

    E. Trainer ----

    F. Online Help-----

    G. Training Approach in General-----

13. Please state any suggestions you have for improving the training process:

14. What are your initial reactions to these new programs?

15. How much to you expect to use the ARPANET for TEN-C activity in the next year?

16. How many hours/week (minimum -> maximum) might you spend online in TEN-C activity in the next few months?

17. Do you expect the TEN-C System to support or hinder your project? Please explain why:

E. WHERE DO WE GO FROM HERE?

This document reports progress made on the development of a tutorial for introducing users to the TEN-C System. As of this writing, the tutorial is in a more or less dormant stage. We do not plan to apply or evaluate it in any projects currently funded. However, we have thought about its future development. In closing, we suggest some steps which should be taken prior to or as a part of an, future application of the TEN-C tutorial.

First, the effectiveness of the tutorial should be clearly established. This can be done in comparison with other training methods or with respect to prespecified performance constraints. Evaluation criteria might include cost and time to present the tutorial, error rates for use of the TEN-C programs, and user attitudes. A questionnaire was included in the previous section of this report, which can be used to record user characteristics and attitudes toward the tutorial and the TEN-C System.

Such a formal evaluation has not yet been undertaken. The tutorial has evolved with successive training situations, each of which trained only one or two students. A larger sample of students must be trained before definitive evaluation of the tutorial can be made.

Modification of the tutorial may be necessary to accommodate new users with special backgrounds. For example, someone familiar with another text editor on the PDP-10 might want to continue using that editor in place of XED. Experience with the ***Sample Task*** may well suggest that it be revised. Revision of the programs, which continually goes on at ISI, may require updating of the handouts.

In any case, this tutorial represents an alternative to the typical approaches to training new users: cookbook descriptions of procedures, reading lengthy user manuals, and (worst of all) the "watch me and remember" technique. It greatly reduces the number of commands to be learned and used as the student is getting used to the collection of program command languages. It introduces some of the underlying concepts necessary for an understanding of TEN-C, without requiring the new user to become a programmer. Finally, this tutorial presents an integrated orientation to a set of sophisticated programs for electronic notebook and conferencing activity.

APPENDIX 1 : ZCONFER Command Descriptions

The following is a slightly extended version of the online documentation for the ZCONFER program. First a list of commands is presented. Then a brief description of each command is given.

COMMANDS: (do not type the words in parentheses.)

ACtivity (information)
AGenda (information)
CHange (password) <NEW PASSWORD>
COnference (information)
Describe <SUBCOMMAND>
Exec
Go (to activity) <NUMBER>
Join (conference) <NUMBER>
Next (activity)
Put (entries) <OPTION>
Quit
REStart
REView (entries) <OPTION>
SAve (transcript for activities) <NUMBER>
STatus (of participants)
SUbmit (file) <FILENAME>

DESCRIPTIONS OF THE COMMANDS:

ACTIVITY -- prints out the name and any background information for the current activity.

AGENDA -- prints out the "topic structure" for the conference.

CHANGE -- permits you to change your password to the word specified. For example, type "change 1776"

CONFERENCE -- prints out the title and any background information for the conference.

DESCRIBE -- explains the use of other commands. For example, "describe save" explains the SAVE command. "describe all" will print out a description of all action commands.

EXEC -- starts a lower "fork" with the TENEX executive. This allows you to run another program, such as the XED text editor. To return to the conference from TENEX (@ Prompt), you type "quit" as a TENEX command. You will be in command mode in the conference again.

GO -- moves you to another activity within the conference.

JOIN -- puts you into the conference you specify. If you want a list of conferences open to you, type "join ?".

NEXT -- moves you to the next activity on the agenda, if there is one.

PUT -- puts the entries you specify from the present activity into the file you specify. This may be an already existing file or a new file. To send this listing to a lineprinter, specify the file as 'lpt:". (Don't omit the colon.)

To specify entries you may use any of the following, alone or in combinations (with either the Put or the REView command):

BY <a list of participant names (or the word ALL)>
IN <a list of entry numbers (or the word ALL)>
LAST <NUM> entries; to see only the previous entry, simply type LAST
BEFORE, ON or AFTER <a date such as 17-APR-73 or 5/17/73>
BETWEEN <a date> AND <another date>
RE <a topic word in quotation marks>; e.g., RE "energy"

In addition, if you do not wish to see the heading and complete text of the entries you have specified, you may use any of the following restrictions:

BY FIRST LINE
BY FIRST <NUM> LINES
NO HEADING
NO TEXT

QUIT -- closes the conference for you and returns you to the TENEX executive language.

RESTART -- takes you back to the beginning of the conference.

REVIEW -- retrieves and displays the discussion entries you specify. You may use any of the options listed under the PUT command above.

SAVE -- saves the transcript from the activities specified by placing them in the file you

specify. Do not specify topic numbers, but rather the activity numbers (which all have decimals in them). For example, "save 1" will get no entries, while "save 1.1" will get all entries in that activity. To save the entire conference, type "save all".

STATUS -- prints out a roster of conference participants and tells which activity each of the active participants is in.

SUBMiT -- inserts the text file which you specify. This file becomes the next entry in the current activity. It has your name. You are immediately notified of the number which has been assigned to the submitted entry. (Do not submit files containing line numbers.)

REFERENCES

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2 Myer, Theodore H. and John R. Barnaby, with revision by William H. Plummer, ***TENEX EXECUTIVE LANGUAGE -- MANUAL FOR USERS***, Cambridge: Bolt, Beranek and Newman, Inc, Revised April 1973.

3 Vallee, Jacques, Hubert M. Lipinski and Richard Miller, ***GROUP COMMUNICATION THROUGH COMPUTERS, Volume 1: Design and Use of the Forum System, R-32,*** Menlo Park: Institute for the Future, July 1974.